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Chami et al.

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(54) **MODULAR LIGHTBAR SYSTEM AND METHOD**

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F21Y 2103/10 (2016.08); F21Y 2115/10
(2016.08)

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(58) **Field of Classification Search**

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CPC . F21V 23/04; F21V 23/06; F21V 5/04; F21V
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F21Y 2103/10; F21Y 2115/10; F21S
2/005

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See application file for complete search history.

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(22) Filed: **Jan. 29, 2021**

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(Continued)

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Primary Examiner — Kevin Quarterman

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Jun. 5, 2020, now Pat. No. 10,914,435, which is a
division of application No. 15/945,843, filed on Apr.
5, 2018, now Pat. No. 10,683,973.

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25, 2017.

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F21V 5/04 (2006.01)
F21V 23/06 (2006.01)
F21V 23/04 (2006.01)
F21V 21/30 (2006.01)
F21Y 103/10 (2016.01)
F21Y 115/10 (2016.01)
F21V 23/00 (2015.01)

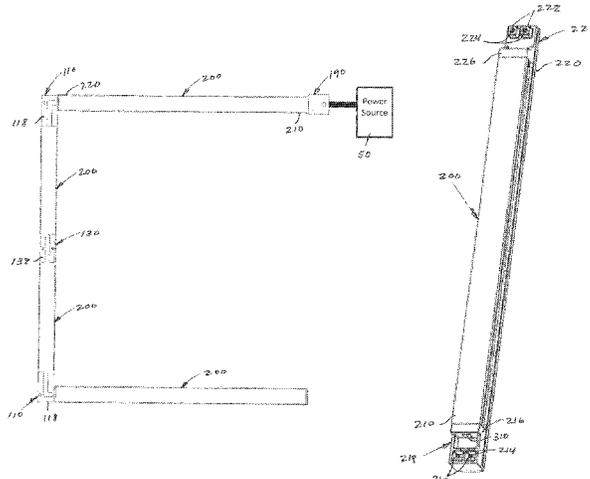
(57) **ABSTRACT**

A lightbar assembly connector for use in a modular lightbar
system to connect two or more lightbar assemblies together
and having a design and configuration that enables the
lightbar assembly connector and lightbar assemblies to be
connected by moving the lightbar assembly connector in a
direction generally transverse to the longitudinal axis of the
lightbar assembly (or by moving the lightbar assembly in a
direction generally transverse to the major surface of the
lightbar assembly connector). It is thus possible to assemble
a modular lightbar system comprised of a plurality of
lightbar assemblies and lightbar assembly connectors, any of
which are easily removable, replaceable, or serviceable
without having to remove or move lightbar assemblies that
do not need to be replaced or serviced.

(52) **U.S. Cl.**

CPC **F21S 2/005** (2013.01); **F21V 5/04**
(2013.01); **F21V 23/04** (2013.01); **F21V 23/06**
(2013.01); **F21V 21/30** (2013.01); **F21V**

20 Claims, 12 Drawing Sheets



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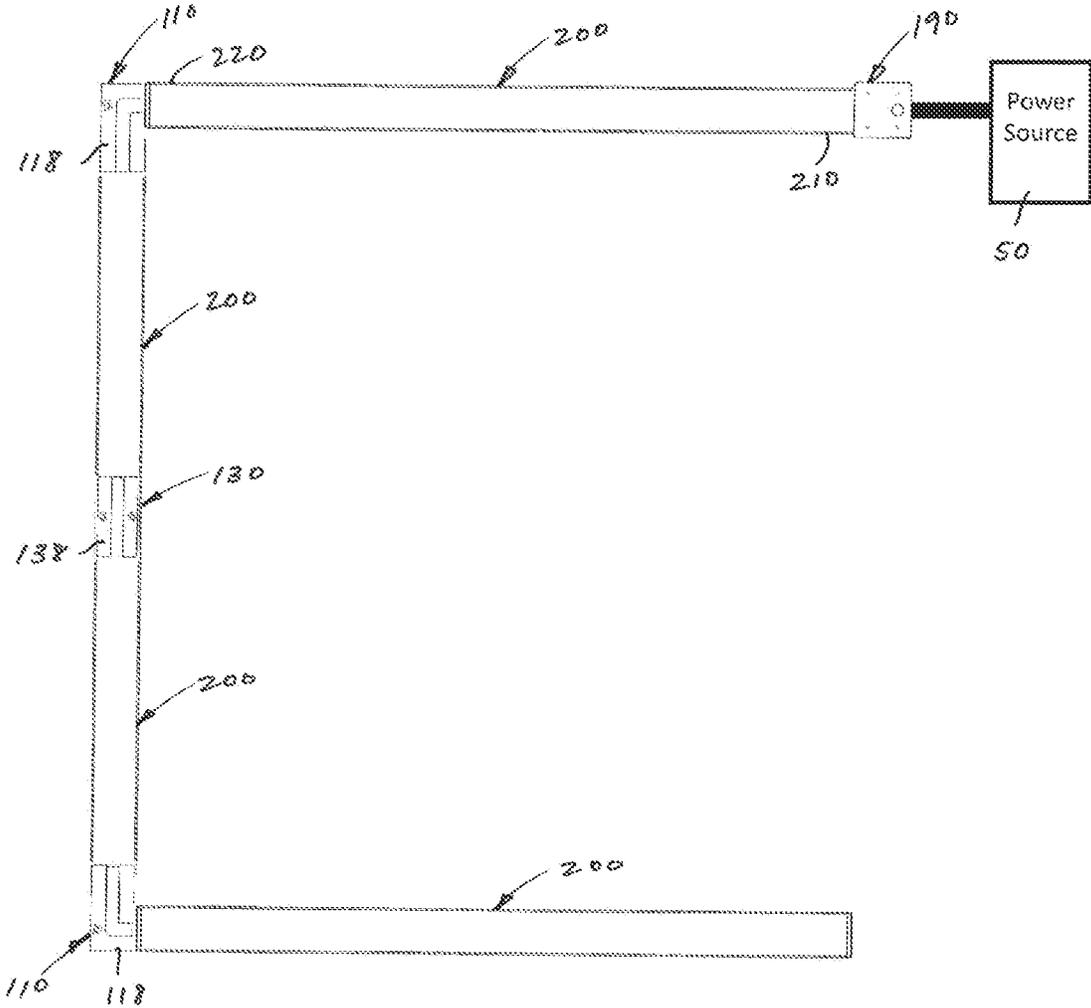


FIG. 1

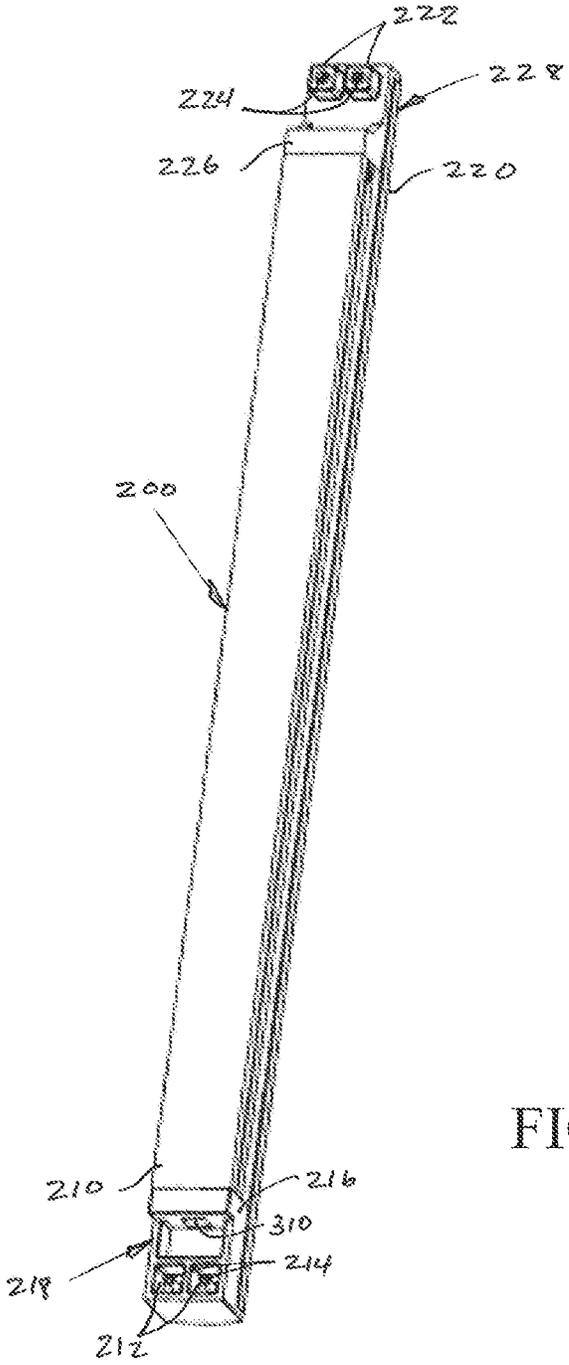


FIG. 2

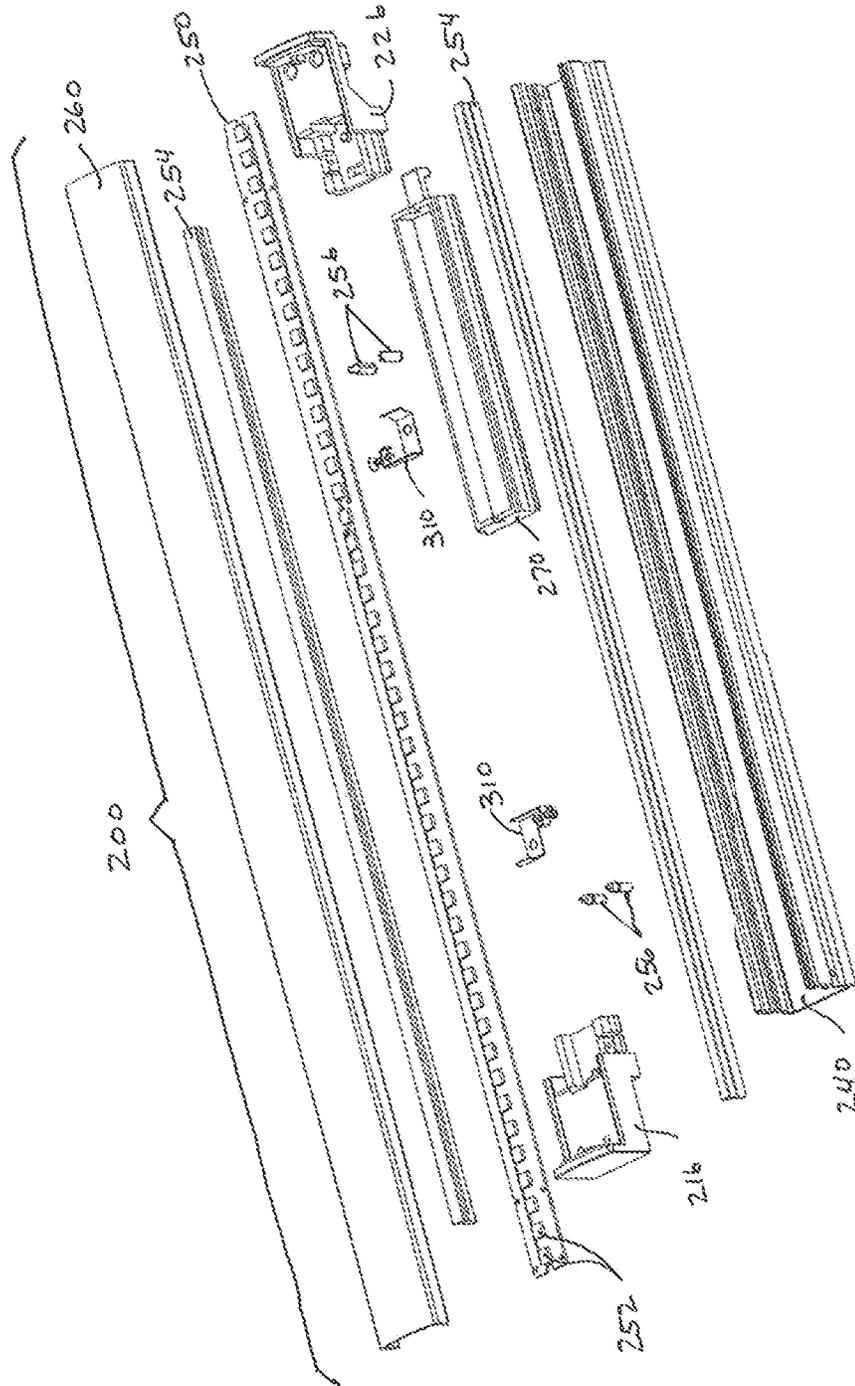


FIG. 3

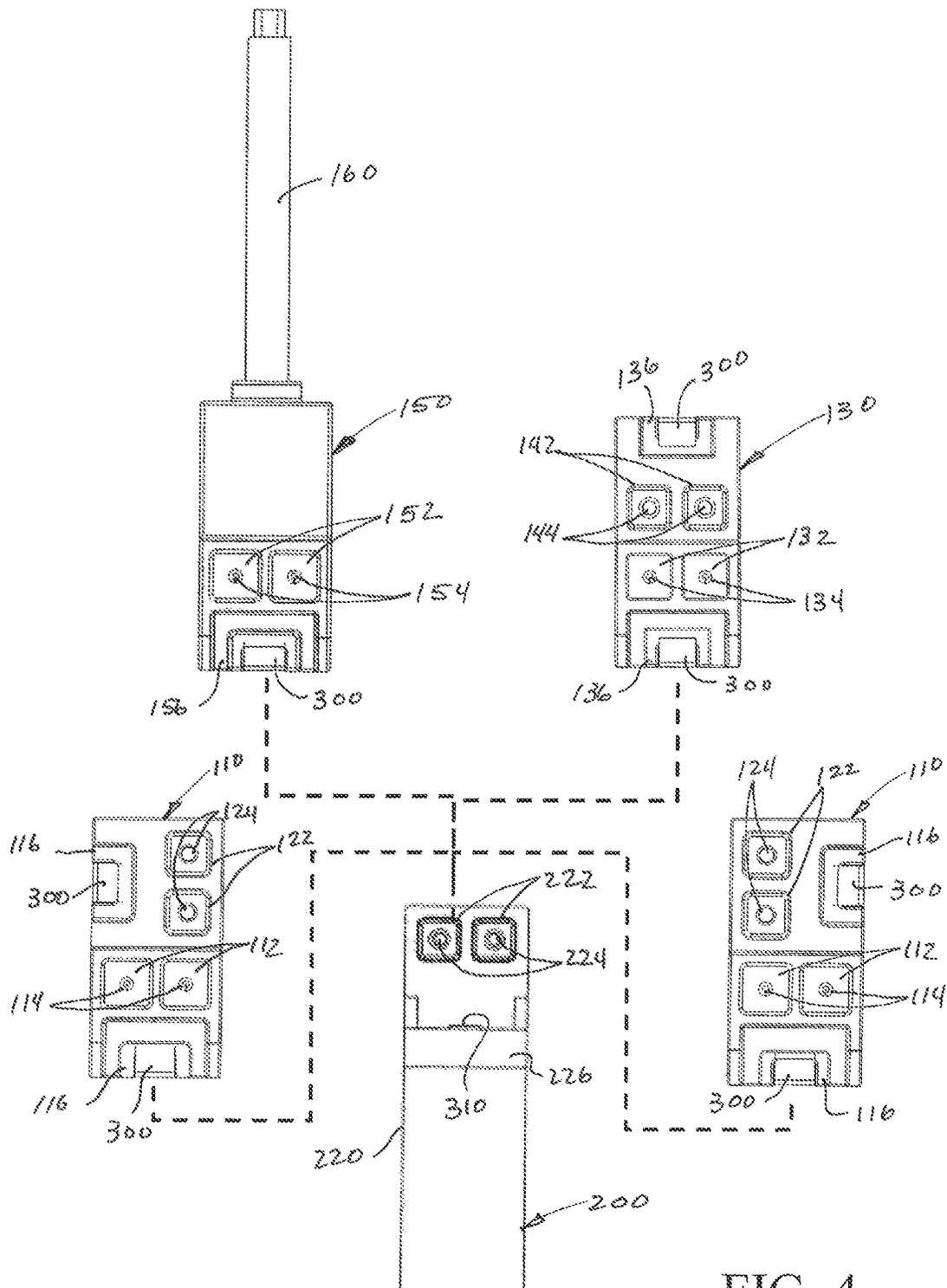


FIG. 4

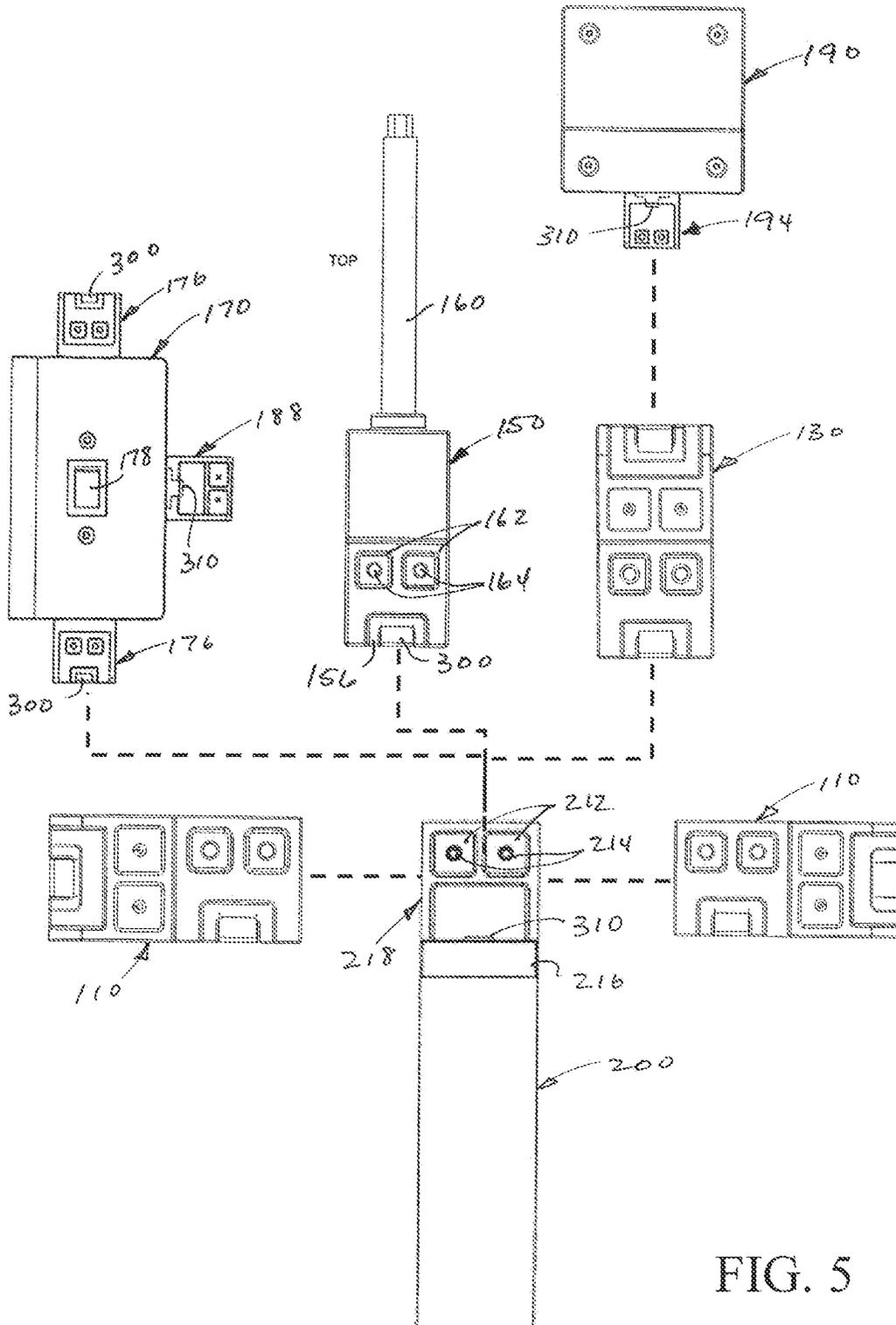


FIG. 5

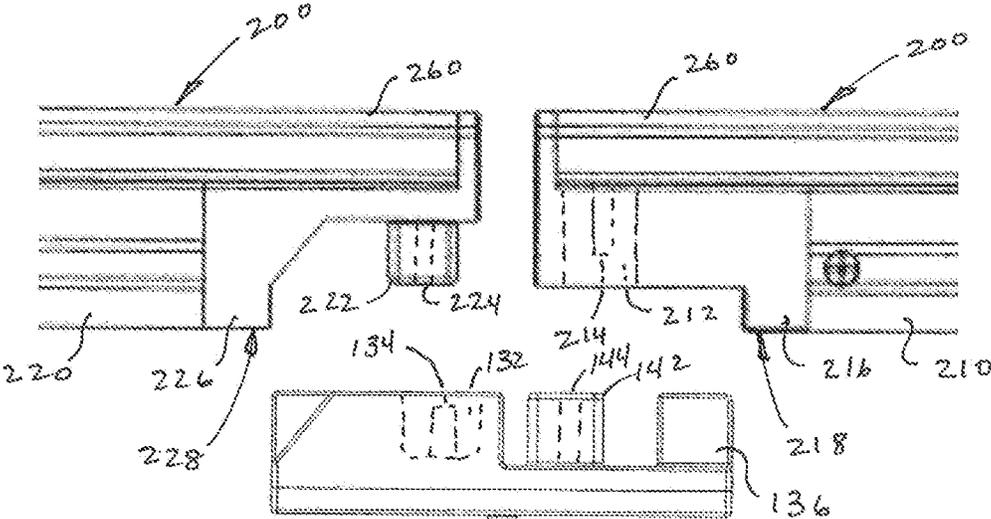


FIG. 6

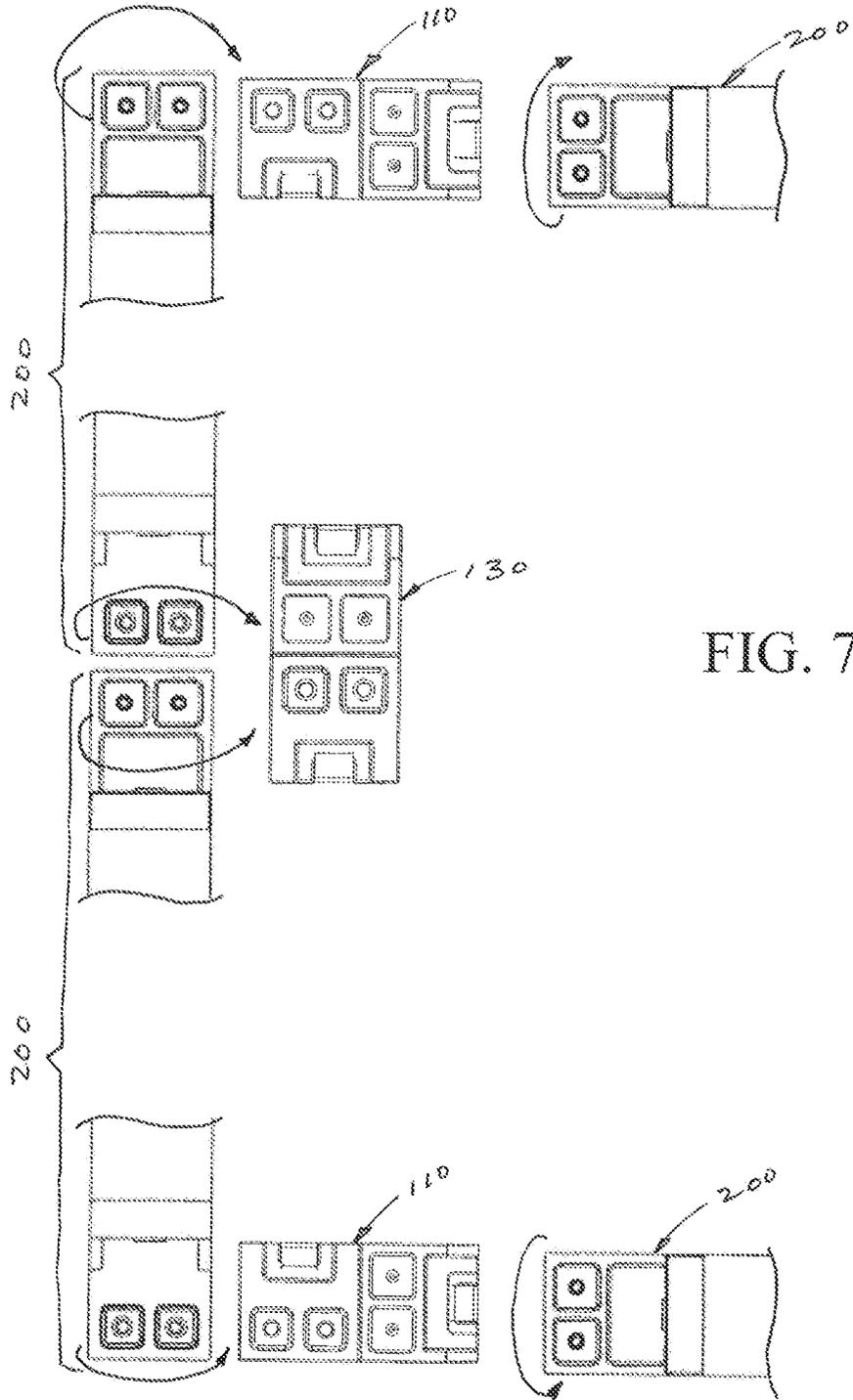


FIG. 7

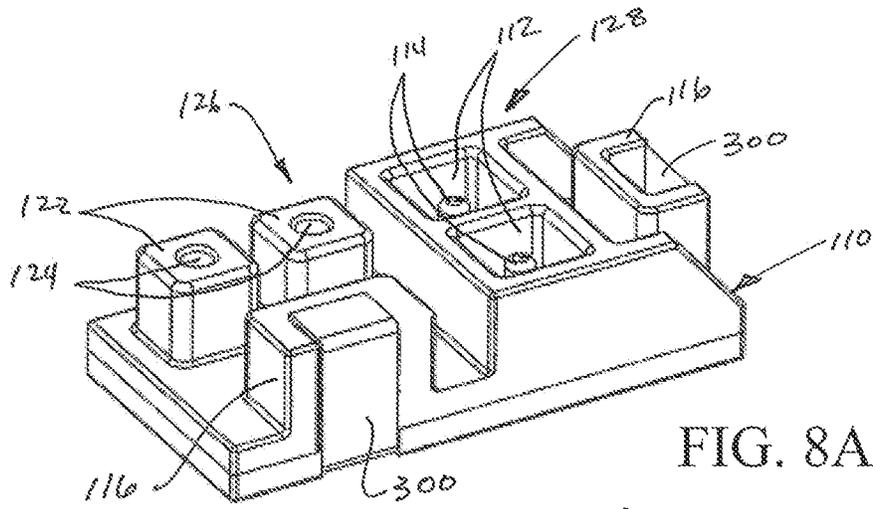


FIG. 8A

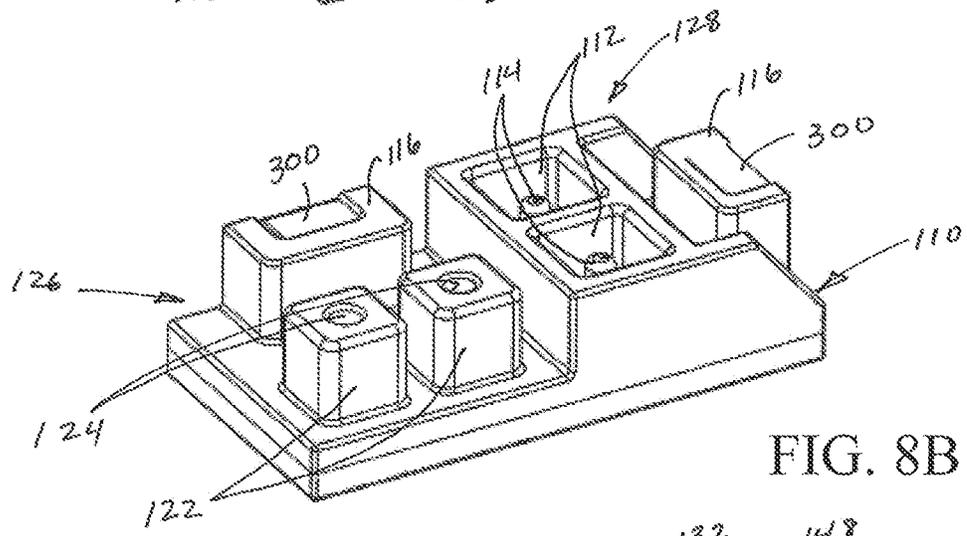


FIG. 8B

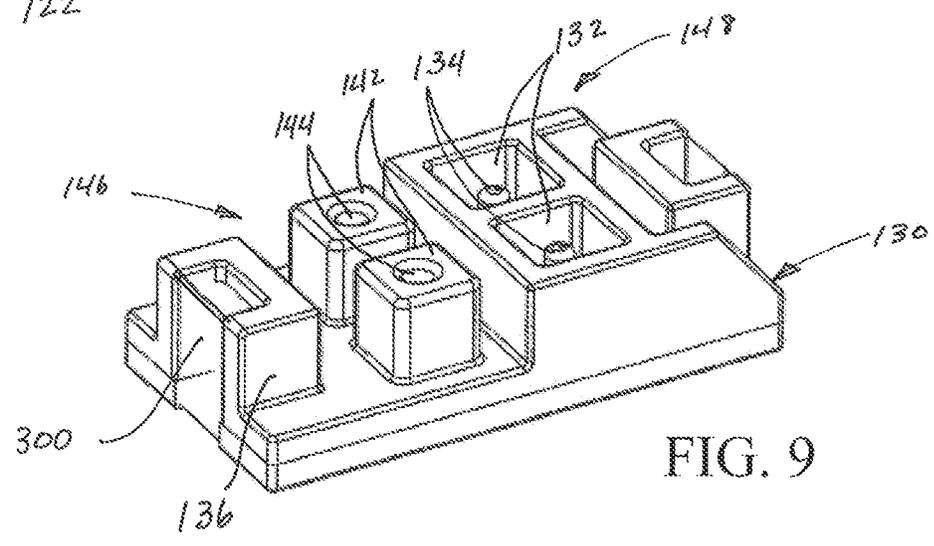


FIG. 9

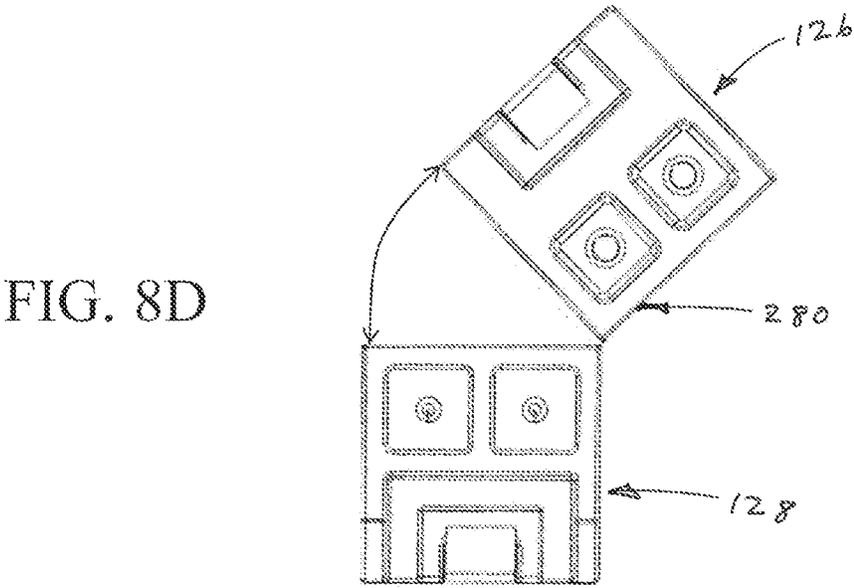
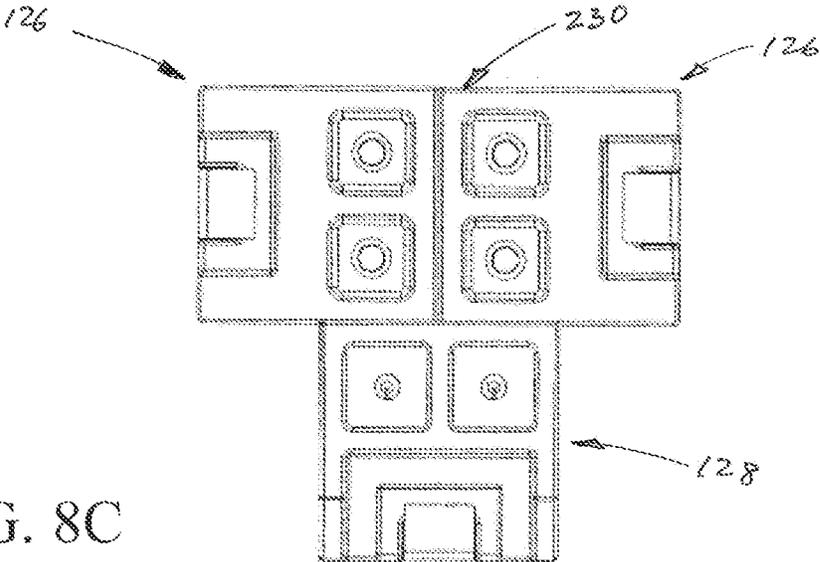


FIG. 10A

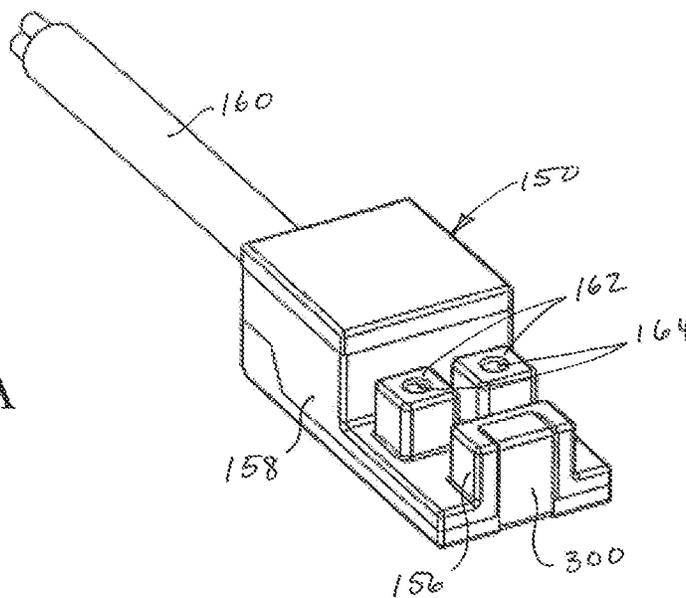
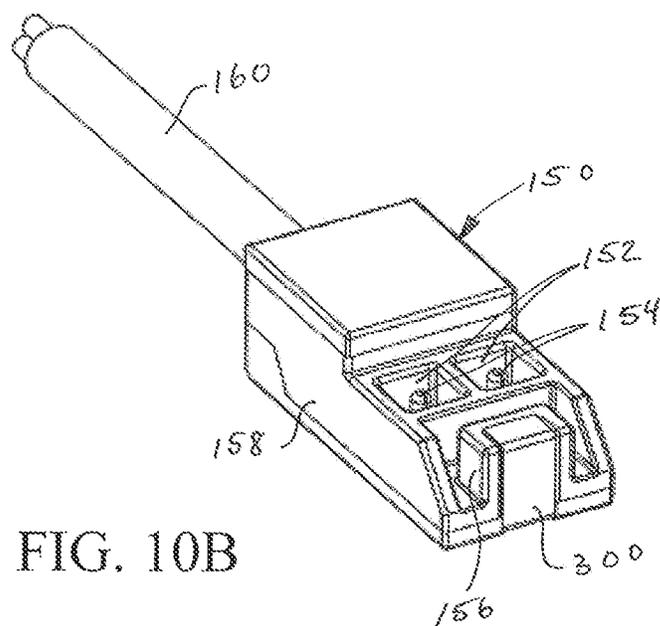


FIG. 10B



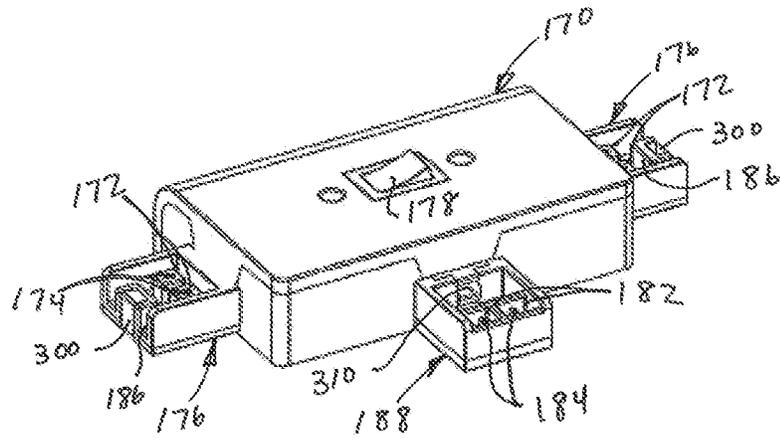


FIG. 11

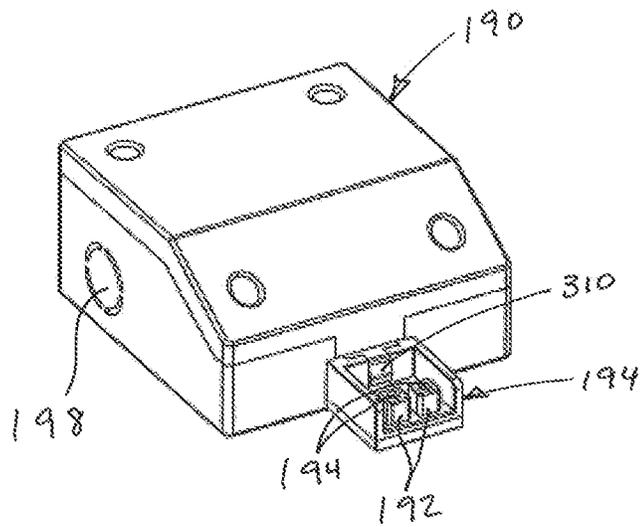


FIG. 12

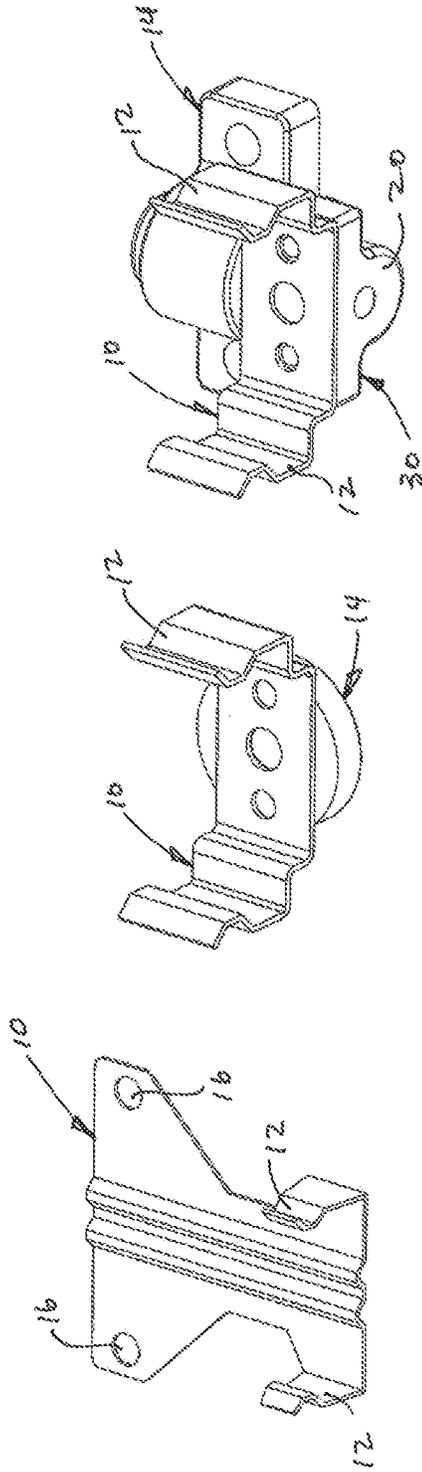


FIG. 13C

FIG. 13B

FIG. 13A

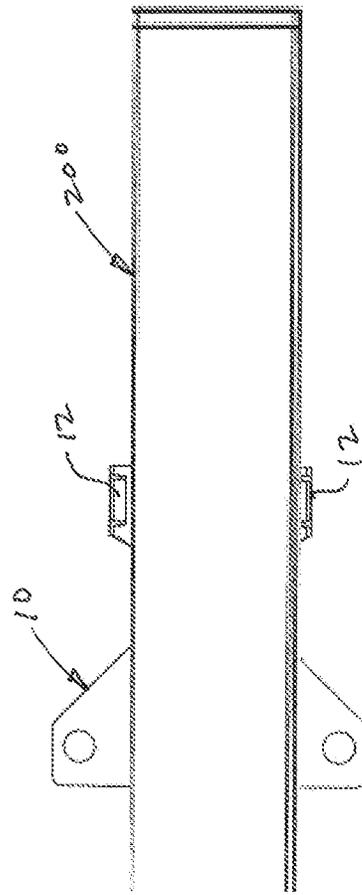


FIG. 13D

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MODULAR LIGHTBAR SYSTEM AND METHOD**CROSS-REFERENCE TO RELATED APPLICATIONS**

This application is a continuation of U.S. patent application Ser. No. 16/893,848, filed Jun. 5, 2020, now U.S. Pat. No. 10,914,435, which is a division of U.S. patent application Ser. No. 15/945,843, filed Apr. 5, 2018, now U.S. Pat. No. 10,683,973, which claims priority to U.S. Provisional Patent Application No. 62/489,586 filed Apr. 25, 2017, the contents of which are incorporated by reference herein.

FIELD OF THE INVENTION

The present invention relates to improvements to modular lightbar systems.

BACKGROUND OF THE INVENTION

Lightbar systems continue to increase in popularity and utility as they become easier to use and install, and cheaper to manufacture and operate. Using solid state lights (SSL) as the light source provides increased reliability and usable life, as well as simplicity of installation and service. Lightbar systems with an SSL light source are virtually trouble-free, and last well beyond the expected life of incandescent or fluorescent light sources.

Lightbar systems typically comprise one or more lightbar assemblies connected in a desired layout, e.g., under-cabinet lighting in a kitchen, display cases, cove lighting, track lighting, and wall wash lighting applications. The lightbar assemblies are elongate rectangularly shaped, and connected, end-to-end, using a joiner that electrically connects one lightbar assembly to another. Once the lightbar assemblies are connected to form a lightbar system, a single lightbar assembly cannot be removed without removing the adjacent lightbar assemblies to which it is connected. This presents significant problems for removing a lightbar assembly that is not located at an end of the lightbar system. It may be the case that the entire lightbar system must be disassembled to service or replace a single lightbar assembly.

Thus, there exists a need for a solution to the above-identified shortcomings of the prior art.

SUMMARY OF THE INVENTION

The present invention is directed to a modular light system that overcomes the above-described shortcomings in the art. Specifically, in accordance with an embodiment of the present invention, and as an object of the present invention, a modular lightbar system is provided that is more flexibly configurable, enabling easy installation, configuration and service.

Such a design and configuration enables the lightbar assembly connector and lightbar assembly to be connected by moving the lightbar assembly connector in a direction generally transverse to the longitudinal axis of the lightbar assembly (or by moving the lightbar assembly in a direction generally transverse to the major surface of the lightbar assembly connector). It is thus possible, in accordance with embodiments of the present invention, to assemble a lightbar system comprised of a plurality of lightbar assemblies and lightbar assembly connectors, any of which are removable, replaceable, serviceable, etc., without having to disassemble the entire lightbar system. Any one component (e.g., lightbar

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assembly, lightbar assembly connector, etc.) may be removed and replaced simply, easily and safely.

DESCRIPTION OF THE DIAGRAMS

Embodiments of the present invention will now be described with reference to the following diagrams, wherein:

FIG. 1 depicts a lightbar system in accordance with an embodiment of the present invention;

FIG. 2 is a perspective view of a lightbar assembly in accordance with an embodiment of the present invention;

FIG. 3 is an exploded view of a lightbar assembly in accordance with an embodiment of the present invention;

FIG. 4 depicts a plug end of a lightbar assembly and a variety of lightbar assembly connectors in accordance with an embodiment of the present invention;

FIG. 5 depicts a receptacle end of a lightbar assembly and a variety of lightbar assembly connectors in accordance with an embodiment of the present invention;

FIG. 6 depicts a plug end and a receptacle end of two lightbar assemblies, and a straight lightbar assembly connector in accordance with an embodiment of the present invention;

FIG. 7 depicts a plurality of lightbar assemblies and lightbar assembly connectors in accordance with an embodiment of the present invention;

FIGS. 8A and 8B are perspective views of two embodiments of an angle lightbar assembly connector in accordance with embodiments of the present invention;

FIGS. 8C and 8D depict, respectively, a T-connector lightbar assembly connector, and a variable angle lightbar assembly connector in accordance with embodiments of the present invention;

FIG. 9 is a perspective view of a straight lightbar assembly connector in accordance with an embodiment of the present invention;

FIGS. 10A and 10B are perspective views of two embodiments of a joiner assembly in accordance with embodiments of the present invention;

FIG. 11 is a perspective view of a distribution box in accordance with an embodiment of the present invention;

FIG. 12 is a perspective view of a power connection box in accordance with an embodiment of the present invention; and

FIGS. 13A-13D are views of three embodiments of a mounting bracket in accordance with embodiments of the present invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The present invention will now be described in detail and with reference to the drawing figures. Referring first to FIGS. 1-7, a lightbar system 100 in accordance with an embodiment of the present invention comprises a lightbar assembly 200 and at least a lightbar assembly connector 110, 130, 150, 170 or 190. The lightbar assembly connector may be a straight connector 130, and angle connector 110, a joiner assembly 150, a distribution box 170 or a power connector box 190. Each of these will be described in more detail below. The embodiment of FIG. 1 depicts a plurality of lightbar assemblies 200 connected by a plurality of lightbar assembly connectors 110, 130 to form a "S", "Z", "C", or "U" shaped configuration. This depiction is exemplary only, and the present invention is flexibly and selectively configurable in countless configurations. Each light-

bar assembly 200 has a receptacle end 210 and a plug end 220 that are located at longitudinally separated ends of the lightbar assembly 200. The receptacle end 210 has a receptacle end cap 216 that is configured as a receptacle connector 218 having two receptacles 212, each with a conductive external terminal 214. The external terminals 214 are not accessible beyond the confines of the space defined by the receptacle 212, thus providing a safe connector that prevents unintended or accidental contact with these terminals 214. The plug end 220 has a plug end cap 226 that is configured as a plug connector 228 having two plugs 222, each with a conductive internal terminal 224. Each of the external terminals 214 and internal terminals 224 extend in a direction transverse to a longitudinal axis of the lightbar assembly 200.

As depicted in FIG. 3, a lightbar assembly 200 in accordance with embodiments of the present invention comprises a housing 240 that may be constructed of extruded aluminum, for example, and that is generally elongate with a square, rectangular, oval, elliptical, or other geometric cross section. A SSL strip 250 light source has a plurality of LEDs 252 electrically connected. Conductive pins 256 connect one end of the SSL strip 250 to the external terminals 214 of the receptacle end cap 216, and the other end of the SSL strip 250 to the internal terminals 224 of the plug end cap 226. Ground terminals 310 are mechanically secured to receptacle end cap 216 and plug end cap 226 and to support 254 to provide a ground connection for the SSL strip 250 and for the lightbar assembly 200. The SSL strip 250 is supported by at least one support 254, preferably two supports 254, that maintain the SSL strip 250 in a desired position within the housing 240. The supports 254 may be positioned in thermal contact with the SSL strip 250, acting as a heat sink. If at least one support 254 is in contact with the housing 240, the housing 240 will also function as a heat sink to the SSL strip 250. A lens 260 connects with the housing 240 to enclose the SSL strip 250 within the lightbar assembly 200. The lens 260 may provide diffusion for the light emitted by the LEDs 252. Driver circuitry (not shown) for the SSL strip 250 may be at least partially contained in a driver enclosure 270. Other components may also be provided in the lightbar assembly 200, including, by way of non-limiting example, motion sensors to control aspects of the lightbar assembly such as on/off, brightness, etc., Bluetooth® connectivity, brightness controls, color control, and other components suitable for controlling one or more LEDs.

The modular lightbar system 100 of the present invention also comprises at least one of a straight connector 130, and angle connector 110, a joiner assembly 150, a distribution box 170 or a connection box 190, as depicted in FIGS. 4 and 5. Any one of the lightbar assembly connectors depicted may be connected with the lightbar assembly 200, as described in more detail herein. Referring first to FIG. 4, the plug end 220 of a lightbar assembly 200 is depicted with two angle connectors 110, a straight connector 130 and a joiner assembly 150—only one of which may be releasably connected to a plug end 220 of the lightbar assembly 200 at one time. The plug connector 228 has two plugs 222, each having a conductive internal terminal 224. The plugs 222 and terminals 224 are sized and shaped to respectively engage with and contact a receptacle and terminal of any of an angle connector 110, a straight connector 130 and a joiner assembly 150.

Referring next to FIG. 5, the receptacle end 210 of a lightbar assembly 200 is depicted with two angle connectors 110, a straight connector 130, a joiner assembly 150, a distribution box 170, and a power connector box 190—only

one of which may be releasably connected to a receptacle connector 218 of the lightbar assembly 200 at one time. The receptacle connector 218 has two receptacles 212, each having a conductive external terminal 214. The receptacles 212 and terminals 214 are sized and shaped to respectively engage with and contact a plug and terminal of any of an angle connector 110, a straight connector 130, a joiner assembly 150, a distribution box 170 and a power connector box 190.

Referring next to FIGS. 8A and 8B, an angle connector 110 in accordance with embodiments of the present invention will now be described in more detail. An angle connector 110 enables connection of two lightbar assemblies 200 at a predefined angle with respect to each other. Preferably, the predefined angle is 90 degrees, but other fixed or selectable angles are contemplated by and within the scope and spirit of the present invention. The embodiments of FIGS. 8A and 8B differ mainly in the orientation of the angle with respect to a longitudinal center line of each lightbar assembly 200. The orientation of the angle of these embodiments differs by 180 degrees when the predetermined angle of the angle connector 110 is 90 degrees. In use, a first lightbar assembly 200 will be installed so that its longitudinal center line is in a desired orientation. A second lightbar assembly 200 may be connected to the first lightbar assembly 200 using an angle connector 110 so that the longitudinal center line of the second lightbar assembly 200 will be at a 90-degree orientation with respect to the longitudinal center line of the first lightbar assembly 200. Whether the second lightbar assembly 200 extends to the right or left of the first lightbar assembly 200 depends upon which angle connector 110 is used.

The angle connector 110 has a receptacle connector 128 and a plug connector 126. The receptacle connector 128 has two receptacles 112, each having a conductive external terminal 114 therein. The receptacles 112 and external terminals 114 are sized and shaped to respectively receive and contactingly engage a plug 222 and conductive internal terminal 224 of a lightbar assembly 200. The plug connector 126 has two plugs 122, each having a conductive internal terminal 124. The plugs 122 and internal terminals 124 are sized and shaped to respectively insert into and contactingly engage a receptacle 212 and conductive external terminal 214 of a lightbar assembly 200. The internal terminals 124 and external terminals 114 each extend in a direction transverse to a major surface 118 (see, e.g., FIG. 1) of the angle connector 110. A post 116 is provided near each of the two receptacles 112 and the two plugs 122 to releasably engage a complementarily sized and shaped part of a lightbar assembly 200. The post 116 has a ground terminal 300 that conductively connects with a ground terminal 310 (see, e.g., FIG. 3) on the complementarily sized and shaped part of the lightbar assembly 200 to which the angle connector 110 is connected. This ensures that the lightbar assembly 200 is fully grounded. The post 116 and part of the lightbar assembly 200 releasably secure the angle connector 110 and lightbar assembly 200 together. An exemplary and illustrative non-limiting connection of an angle connector 110 with a lightbar assembly 200 is depicted in FIGS. 1 and 7.

Referring next to FIGS. 8C and 8D, alternative embodiments of connectors in accordance with the present invention are depicted and will now be discussed. FIG. 8C depicts a T-connector 230 having two plug connectors 126 aligned with each other, and a receptacle connector 128 arranged perpendicular to the plug connectors 126. Alternative configurations are contemplated by, and within the scope and spirit of the present invention. FIG. 8D depicts a variable

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angle connector **280** having a plug connector **126** and a receptacle connector **128** that are arrangeable with respect to each other at any angle from 90° to 0° . Hinging may be by a living hinge, or other known or hereafter developed hinge of any type or construction. Electrical connection between the conductive components of the variable angle connector **280** is maintained throughout movement of the plug connector **126** and receptacle connector **128** with respect to each other by circuitry, circuit boards, conductive paths, cables, wires, or any known or hereafter developed conductive part, material or means.

A straight connector **130** depicted in FIG. 9 enables connection of two lightbar assemblies **200** at a predefined angle with respect to a longitudinal center line of the lightbar assemblies **200**. The preferred predefined angle is 0 degrees, but other angles are contemplated by and within the scope and spirit of the present invention. The straight connector **130** has a plug connector **146** and a receptacle connector **148**. The receptacle connector **148** has two receptacles **132**, each having a conductive external terminal **134** therein. The receptacles **132** and external terminals **134** are sized and shaped to respectively receive and contactingly engage a plug **222** and conductive internal terminal **224** of a lightbar assembly **200**. The plug connector **146** has two plugs **142**, each having a conductive internal terminal **144**. The plugs **142** and internal terminals **144** are sized and shaped to respectively insert into and contactingly engage a receptacle **212** and conductive external terminal **214** of a lightbar assembly **200**. The internal terminals **144** and external terminals **134** each extend in a direction transverse to a major surface **138** (see, e.g., FIG. 1) of the straight connector **130**. A post **136** is provided near each of the two receptacles **132** and the two plugs **142** to releasably engage a part of a lightbar assembly **200**. The post **136** has a ground terminal **300** that conductively connects with a ground terminal **310** (see, e.g., FIG. 3) on the complementarily sized and shaped part of the lightbar assembly **200** to which the straight connector **130** is connected. This ensures that the lightbar assembly **200** is fully grounded. The post **136** and part of the lightbar assembly **200** releasably secure the straight connector **130** and lightbar assembly **200** together. An exemplary and illustrative non-limiting connection of a straight connector **130** with a lightbar assembly **200** is depicted in FIGS. 1, 6 and 7.

An exemplary connection between and among two lightbar assemblies **200** and a straight connector **130** is depicted in FIG. 6. The plug end **220** of a first lightbar assembly **200** is positioned proximate the receptacle end **210** of a second lightbar assembly **200**. A straight connector **130** is positioned so its receptacles **132** are aligned with the plugs **222** of the plug connector **228** of the first lightbar assembly **200**, and so its plugs **142** are aligned with the receptacles **212** of the receptacle connector **218** of the second lightbar assembly **200**. The straight connector **130** is moved in a direction generally transverse to the longitudinal axes of the lightbar assemblies **200** so the plugs **222** of the first lightbar assembly **200** are received in the receptacles **132** of the straight connector **130**, and the internal terminals **224** of the plugs **222** contact the external terminals **134** of the receptacles **132** to establish an electrical connection therebetween. Similarly, the plugs **142** of the straight connector **130** are received in the receptacles **212** of the second lightbar assembly **200**, the external terminals **214** of the second lightbar assembly contactingly the internal terminals **144** of the straight connector **130** to establish an electrical connection therebetween. The posts **136** and ground terminals **300** on the straight connector **130** releasably engage a complementarily sized

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and shaped part defined in each of the plug end cap **226** and receptacle end cap **216**, and the ground terminals **310** is each of the plug end cap **226** and receptacle end cap **216**. In similar fashion, the plurality of lightbar assembly connectors depicted in FIG. 7 are releasably connectable with the plurality of lightbar assemblies **200**. The various lightbar assembly connectors depicted in FIG. 7 would be rotated as indicated when connecting them to the lightbar assemblies **200**. The present invention thus provides a simple, convenient, safe and reliable lightbar system **100** where components may be connected and disconnected to add, replace, service or reconfigure the lightbar system **100** without having to unnecessarily remove components. This is accomplished by orienting the various conductive terminals generally transverse to a longitudinal axis of a lightbar assembly and to a major surface of the lightbar assembly connectors, resulting in the ability to connect and disconnect various components simply and easily.

A joiner assembly **150**, depicted in FIGS. 10A and 10B, may be connected to a lightbar assembly **200** to route power around an object. For example, it may be desirable to power two lightbar assemblies **200** from the same power source **50**, but it is not possible to directly connect the two lightbar assemblies **200** due to an obstruction located between them. A first joiner assembly **150** may be connected to a first lightbar assembly **200**, and a second joiner assembly **150** may be connected to a second lightbar assembly **200**. A cable **160** may be connected between the two joiner assemblies **150** and routed around the obstruction to provide a path for power between the lightbar assemblies **200** despite the presence of an obstacle. The embodiment of FIG. 10A has a modular connector **158** with two plugs **162**, each having a conductive internal terminal **164**, and the embodiment of FIG. 10B has a modular connector **158** with two receptacles **152**, each having a conductive external terminal **154**. Both embodiments also have a post **156** to releasably engage a complementarily sized and shaped part of a lightbar assembly **200**. The post **156** has a ground terminal **300** that conductively connects with a ground terminal **310** on the complementarily sized and shaped part of the lightbar assembly **200** to which the joiner assembly **150** is connected.

A distribution box **170**, depicted in FIG. 11, may be connected to at least one lightbar assembly **200**. The embodiment depicted in FIG. 11 has two plug connectors **176** and one receptacle connector **188**. Alternatively, the distribution box **170** may have two receptacle connectors **188** and one plug connector **176**. Each of the plug connectors **176** has two plugs **172**, each having a conductive internal terminal **174**. The receptacle connector **188** has two receptacles **182**, each having a conductive external terminal **184**. A switch **178** controls power to the transversely aligned connector, and to the components connected thereto. For the embodiment of FIG. 11, the switch **172** controls power to the receptacle connector **188**.

A power connector box **190**, depicted in FIG. 12, provides connection between the power source **50** and a lightbar assembly **200**. Connection to the power source **50** is made using a power cable (not shown) routed to an interior of the power connector box **190** through an opening **198** to terminals (not shown) in the interior of the power connection box **190**. The interior terminals are conductively connected to conductive internal terminals **196** provided in plugs **192** of a plug connector **194**. Connection of the plug connector **194** to a receptacle connector **218** of a lightbar assembly **200** provides a path to the lightbar assembly **200** from the power source. Alternatively, the power connector box may have a

receptacle connector that is connectable to a plug connector **228** of a lightbar assembly **200**.

Individual lightbar assemblies **200** and the lightbar system **100** of the present invention are mountable to a surface using one or more mounting brackets, such as depicted in FIGS. **13A-13C**. The mounting bracket **10** of FIG. **13A** comprises two clips **12** that are sized and shaped to self-guide a lightbar assembly **200** into the bracket **10**, and that are self-biased to hold the lightbar assembly **200** in place. Two mounting holes **16** are provided for screws or other similar mounting means to secure the mounting bracket **10** to a surface such as, for example, the underside of a kitchen cabinet. The mounting holes **16** are located outside the footprint of a lightbar assembly **200** when it is held in place in the mounting bracket **10** by the clips **12**, as depicted in FIG. **13D**. The mounting bracket **10** may alternatively have a base **14** that adheres to a surface without the need for additional fasteners or mounting means. The embodiment depicted in FIG. **13B** includes a magnet (not shown) in the base **14** to secure the mounting bracket **10** to a magnetic surface. Alternatively, double-sided tape, Velcro®, or other known or hereafter developed self-fastening or self-securing means may be provided to secure the base **14** of this embodiment to a surface. In another alternative embodiment depicted in FIG. **13C**, the mounting bracket **10** comprises a pivotable mounting bracket **30** connected to the base **14** with a coupling **20** that may provide pivoting or rotating movement of the lightbar assembly **200** mounted to the surface using this mounting bracket **10**. This enables selective positioning of the lightbar assembly **200** to control the direction of light distribution. Mounting holes **16** for this embodiment are also provided outside the footprint of a lightbar assembly **200** when it is held in place in this mounting bracket **10**.

Modifications to embodiments of the present invention are possible without departing from the scope of the invention as defined by the accompanying claims. Expressions such as “including,” “comprising,” “incorporating,” “consisting of,” “have,” “is,” used to describe and claim the present invention are intended to be construed in a non-exclusive manner, namely allowing for items, components or elements not explicitly described herein also to be present. Reference to the singular is to be construed to relate to the plural, where applicable.

What is claimed is:

1. A lightbar assembly connector for connecting a first lightbar assembly to a second lightbar assembly without having to remove or move the first lightbar assembly or the second lightbar assembly, said lightbar assembly connector comprising:

- a major surface;
- a first connector having a conductive part extending in a direction transverse to said major surface and complementarily sized and shaped to releasably connect with a first lightbar conductive part on the first lightbar assembly;
- a second connector having a conductive part extending in a direction transverse to said major surface and complementarily sized and shaped to releasably connect with a second lightbar conductive part on the second lightbar assembly; and

wherein said lightbar assembly connector is releasably connected to the first lightbar assembly and to the second lightbar assembly by moving said lightbar assembly connector in a direction transverse to said major surface of said lightbar assembly connector without removing or moving the first lightbar assembly or the second lightbar assembly.

2. A lightbar assembly connector of claim **1** further comprising one of an angle connector, a straight connector, a T-connector, a variable angle connector, a joiner assembly, a distribution box, and a connection box.

3. A lightbar assembly connector of claim **1** further comprising one of an angle connector and a variable angle connector, connectable between the first lightbar assembly and the second lightbar assembly so that a longitudinal axis of the first lightbar assembly is at a non-zero angle to a longitudinal axis of the second lightbar assembly when said lightbar assembly connector is connected therebetween.

4. A lightbar assembly connector of claim **3**, wherein the non-zero angle ranges from 0° to 90°.

5. A lightbar assembly connector of claim **4**, wherein the non-zero angle is 90°.

6. A lightbar assembly connector of claim **3**, wherein the non-zero angle is fixed.

7. A lightbar assembly connector of claim **3**, wherein the non-zero angle is variable.

8. A lightbar assembly connector of claim **1**, further comprising a joiner assembly comprising a cable providing an electrical path between said first connector and said second connector.

9. A lightbar assembly connector of claim **1**, wherein: said first connector comprises a receptacle connector with a conductive external terminal extending in a direction transverse to said major surface; and said second connector comprises a plug connector with a conductive internal terminal extending in a direction transverse to said major surface.

10. A lightbar assembly connector of claim **9**, wherein said first connector and said second connector each have a grounding post extending in a direction transverse to said major surface.

11. A lightbar assembly connector of claim **9**, wherein: said receptacle connector has two receptacles each having a conductive external terminal extending in a direction transverse to said major surface; and said plug connector has two plugs each having a conductive internal terminal extending in a direction transverse to said major surface.

12. A lightbar assembly connector of claim **11**, wherein said first connector and said second connector each have a grounding post extending in a direction transverse to said major surface.

13. A lightbar assembly connector for connecting a first lightbar assembly to a second lightbar assembly and a third lightbar assembly without having to remove or move the first lightbar assembly, the second lightbar assembly or the third lightbar assembly, said lightbar assembly connector comprising:

- a major surface;
- a first connector having a conductive part extending in a direction transverse to said major surface and complementarily sized and shaped to releasably connect with a first lightbar conductive part on the first lightbar assembly;
- a second connector having a conductive part extending in a direction transverse to said major surface and complementarily sized and shaped to releasably connect with a second lightbar conductive part on the second lightbar assembly;
- a distribution box comprising a third connector having a conductive part extending in a direction transverse to said major surface and complementarily sized and shaped to releasably connect with a third lightbar

conductive part on the third lightbar assembly and a switch for opening and closing an electrical path to said third connector; and

wherein said lightbar assembly connector is releasably connected to the first lightbar assembly, the second lightbar assembly and the third light bar assembly by moving said lightbar assembly connector in a direction transverse to said major surface of said lightbar assembly connector without removing or moving the first lightbar assembly, the second lightbar assembly, or the third lightbar assembly.

14. A lightbar assembly connector of claim 13, wherein: said first connector comprises a plug connector with a conductive internal terminal extending in a direction transverse to said major surface;

said second connector comprises a plug connector with a conductive internal terminal extending in a direction transverse to said major surface; and

said third connector comprises a receptacle connector with a conductive external terminal extending in a direction transverse to said major surface.

15. A lightbar assembly connector of claim 14, wherein said first connector, said second connector and said third connector each have a grounding post extending in a direction transverse to said major surface.

16. A lightbar assembly connector of claim 14, wherein: said receptacle connector has two receptacles each having a conductive external terminal extending in a direction transverse to said major surface; and

both of said plug connectors have two plugs each having a conductive internal terminal extending in a direction transverse to said major surface.

17. A lightbar assembly connector of claim 16, wherein said first connector, said second connector and said third connector each have a grounding post extending in a direction transverse to said major surface.

18. A lightbar assembly connector for connecting a first lightbar assembly to a power source without having to remove or move the first lightbar assembly, said lightbar assembly connector comprising:

- a major surface;
- a first connector having a conductive part extending in a direction transverse to said major surface and complementarily sized and shaped to releasably connect with a first lightbar conductive part on the first lightbar assembly;
- a connection box connectable to said first connector and a power source; and

wherein said lightbar assembly connector is releasably connected to the first lightbar assembly by moving said lightbar assembly connector in a direction transverse to said major surface of said lightbar assembly connector without removing or moving the first lightbar assembly.

19. A lightbar assembly connector of claim 18, wherein said first connector comprises:

- a plug connector with a conductive internal terminal extending in a direction transverse to said major surface; and
- a grounding post extending in a direction transverse to said major surface.

20. A lightbar assembly connector of claim 19, wherein said plug connector has two plugs each having a conductive internal terminal extending in a direction transverse to said major surface.

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